

Classification of herbs plant diseases via hierarchical dynamic artificial neural network

ABSTRACT

When herbs plants has disease, they can display a range of symptoms such as colored spots, or streaks that can occur on the leaves, stems, and seeds of the plant. These visual symptoms continuously change their color, shape and size as the disease progresses. Once the image of a target is captured digitally, a myriad of image processing algorithms can be used to extract features from it. The usefulness of each of these features will depend on the particular patterns to be highlighted in the image. A key point in the implementation of optimal classifiers is the selection of features that characterize the image. Basically, in this study, image processing and pattern classification are going to be used to implement a machine vision system that could identify and classify the visual symptoms of herb plants diseases. The image processing is divided into four stages: Image Pre-Processing to remove image noises (Fixed-Valued Impulse Noise, Random-Valued Impulse Noise and Gaussian Noise), Image Segmentation to identify regions in the image that were likely to qualify as diseased region, Image Feature Extraction and Selection to extract and select important image features and Image Classification to classify the image into different herbs diseases classes. This paper is to propose an unsupervised diseases pattern recognition and classification algorithm that is based on a modified Hierarchical Dynamic Artificial Neural Network which provides an adjustable sensitivity-specificity herbs diseases detection and classification from the analysis of noise-free colored herbs images. It is also to proposed diseases treatment algorithm that is capable to provide a suitable treatment and control for each identified herbs diseases.

Keyword: HDNN; Bayesian algorithm; Fixed-Valued Impulse Noise; Random-Valued Impulse Noise; Gaussian noise